

# BEDSIDE MEDICINE FOR BEDSIDE DOCTORS

An Open Forum for brief discussions of the workaday problems of the bedside doctor. Suggestions of subjects for discussions invited.

## PREPARATION OF CATHETERIZATION

### I. PATHOLOGY AND DIAGNOSIS

EDWARD W. BEACH, M. D. (Medico-Dental Building, Sacramento).—*Historical Notes.*—Few surgical instruments boast the hoary antiquity of the lowly urethral catheter, and perhaps no single instrument has proved a greater boon generally nor afforded suffering mankind more relief. If we could but conjure a sort of retrospective television, or borrow Eric Bell's "Televisor" and thereby slip chronologically backward into possibly the fourth dynasty, we might behold our noble predecessor, old Imhotep himself, armed with a hollow metal instrument (not historically authenticated), bending over some unfortunate Egyptian in the throes of acute urinary retention. Somewhat later we could applaud the dexterity of the Hindu medico with his metal sonde (as related by Hessler) and follow the catheter's modification and development into the era of Hippocrates. Soon we might witness the advent of the non-metallic or flexible tube among the Arabs. Successively, as the centuries rolled swiftly by, we might study with amazement the bizarre types of catheters which made their appearance notably with the development of the lithotomy operation after the time of Ambroise Paré, and marvel at the unique materials, other than base metals, which were used to fabricate these early-day catheters. Then, if the modern aseptic conscience could withstand the shock, particularly anent catheter accessories and various embellishments, we might later watch with interest the importation of rubber into Europe, and see how quickly this new substance was adapted to the old principle of catheterization.

Taken all in all, it appears logical to assume that the procedure of catheterization must have antedated the Vedāngas, and yet it begins authentically, notwithstanding, in this period. Slowly at first, progress concerned itself with refinement of these pristine instruments as to form, size, shape, and contour, as well as intrinsic composition. With the dawn of aseptic comprehension, thanks to Pasteur and Lord Lister, the improvement in technique now came quickly to the fore. As a net result, today the physician possesses a wide assortment of catheters ranging in size, shape, composition, and structural design, which is sufficient to master almost any deviatory quotient, and the operation is performed aseptically. Indeed, the urethral catheter has now become as common and almost as indispensable to the profession as the carbon radical to the benzene series.

The invention of the first urethral catheter undoubtedly hinged upon the urgent necessity for relief. Even today the catheter still renders its

greatest service, and is most useful to the general profession as an emergency agent for relief of acute urinary retention. For the urologist, however, aside from this retention phase, the urethral catheter becomes a veritable factotum in the urologic domain, so wide and diversified is its application both as to treatment and diagnosis. Considered purely from the diagnostic standpoint, the catheter comprises a sort of ridgetop which offers support for the entire ensemble and about which much of the other urologic structure is draped. In fine, the catheter constitutes a virtual "runner-up" to the cystoscope, and offers the urologist an "open sesame" to the diagnostic realm, through which medium certain priceless information is educed which would be difficult or impossible to obtain in any other way. This diagnostic information may be gleaned directly from behavior of the catheter itself (*e. g.*, with urethral strictures), or indirectly with the catheter merely an intermediary agent for consummation of a definite objective (*e. g.*, the cystogram). Some of this diagnostic information possible of acquisition by means of the urethral catheter might be tabulated as follows:

#### (1) *Concerning the Urethra and Adnexa*

(a) Anent the penile, bulbous, and membranous portions of the urethra: The catheter may, at the outset, detect some urethral anomaly, *e. g.*, a diverticulum, etc. Again, strictures are common about the bulb (especially the venereal type), but these accrue, likewise, in the penile portion. The position, number, type, caliber of luminal diminution, and some idea as to the extent may all be roughly ascertained with the catheter. The catheter is particularly valuable in the "straddle" injury to determine the position, extent, and degree of urethral damage. This injury most often involves the membranous portion, and is usually incomplete, *i. e.*, catheterization is possible.

(b) Anent the pars prostatica: A stricture here, which is rare, usually means tuberculosis or lues. A general decrease in caliber may mean cancer. With prostatic hypertrophy, the prostatic urethra is usually lengthened and its anatomical conformation distorted, contingent upon the portion or portions of the prostate most implicated in the growth. In the precystoscopic era, for diagnostic purposes it was customary to measure accurately the length of the posterior urethra (the distance from the external sphincter to "water," which is normally about 4 centimeters) by calibrations upon the catheter. Any increase in length of this portion of the urethra was indicative of hypertrophy, and the degree of the latter commensurate with the former. An excellent idea of the prostatic lobe or lobes most involved in the

hypertrophy may be adduced from the urethral encroachment, or hence from the type of catheter (Nélaton, Wishard and stylet, Coudé, bicoudé, overcurve, etc.) which is necessary to treat of this architectural deviation and override the given impediment. With use of the catheter and radiopaque media, prostatic urethrography and a study of bladder-neck topography are easily managed. This procedure is particularly informative before and after transurethral resection, for comparison as to tissue removed, anatomical reconstruction, end-results, etc.

## (2) Concerning the Bladder and Bladder Neck

(a) By means of the bladder urine: A catheterized specimen is often essential for diagnosis notably with regard to identification of the offending organism and for cultural study, not to mention determinations of the pus and erythrocytic content. The presence of residual urine is easily established with the catheter. Residual urine usually means vesical neck obstruction, but may connote nerve dysfunction or be indicative of diverticulum. Foul, ammoniacal residual urine suggests stone. A metal catheter may elicit the pathognomonic "click."

(b) By means of the bladder capacity: A bladder capacity under 150 cubic centimeters denotes contracture, while an increase above 600 cubic centimeter means bladder atony. Some idea of the bladder tone can also be acquired in this procedure by the force of the return flow from the urethral catheter. Prior to the development of the roentgen ray this capacity determination had great diagnostic value in suspected bladder rupture.

(c) By means of cystography: The catheter is essential to this procedure. Valuable diagnostic aid is furnished by this maneuver, especially in obstructive lesions about the vesical orifice, *e. g.*, posterior valves in children, contracted vesical neck in the middle-aged, and true prostatism in the aged, etc. Cystography is also of value in the diagnosis of vesical tumors and diverticuli, and especially by contrast pictures in the latter. Cystography is of the greatest importance in suspected vesical injuries, to confirm the presence of bladder rupture and to indicate the location.

(d) By means of the cystometer: The catheter is necessary in this procedure, which comprises a technical method for accurately measuring the intravesical pressure, with a specially constructed manometer (usually the Rose device). Several readings are taken at specific intervals and a graph constructed to be contrasted with the normal. This is the best method, to date, for differentiation of the usual myogenic atony of the bladder contingent upon pure obstructive phenomena from that type of bladder atony dependent solely upon nerve changes. Sometimes, however, these two conditions coexist with confusion of the picture. When defective enervation is present, the cystometer may also help to distinguish which of the three nerve groups, *viz.*, pelvic, hypogastric and pudendal, is at fault. Much knowledge remains undiscovered in this field and most specifically as

to evaluation of sphincter tonus (both internal and external) in its relation to that of the detrusor.

From this brief outline, one immediately appreciates the exalted position which the ancient and lowly urethral catheter has come to assume in the sphere of modern urologic diagnosis.

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## II. TREATMENT

HENRY A. R. KREUTZMANN, M. D. (2000 Van Ness Avenue, San Francisco).—The various conditions in which catheter treatments are important are:

1. Retention due to (a) prostate abscess; (b) urethral stricture; (c) hypertrophied prostate.
2. Rupture of posterior urethra.
3. Cord injury.

There are many types and shapes of catheters. For general purposes, a No. 18F. or 20F. Robinson catheter is excellent. It is a soft rubber catheter with two eyes. The tip has a depression into which a stylet can be inserted without danger of it slipping out and perforating the urethra.

The most common catheter used in women is made of glass. There is always danger of its becoming cracked on boiling and breaking off after insertion. Another disadvantage is the fact that it will promptly fall out if not constantly held in place. The ideal catheter for women is the Furniss metal catheter. It is shaped to fit the female urethra and is self-retaining.

There are two types of retention catheters. They are the mushroom or Pezzar, and the winged or Malecot catheters. The latter are either two- or four-winged. The four-winged is the better, as there is less chance of its slipping out of the bladder. The retention catheters are used following cystostomy. They are not to be inserted through the male urethra.

In women the Malecot catheter is excellent for urethral drainage, as it produces less irritation *in situ* and its removal causes little discomfort.

### Prostatic Abscess

Acute retention following prostatic abscess is nearly always a complication of an acute gonorrheal urethritis. Although instrumentation during a gonorrheal infection is contraindicated, these cases are an exception. A small coudé woven catheter has the proper stiffness, and its tip has the proper angle to ride over the bulging prostate with a minimum of trauma and pain. It should be used in preference to either a soft rubber or metal catheter.

### Urethral Stricture

Acute retention usually results from the complete closure of a strictured area following either an alcoholic or sexual debauch, or both. One may be assured that strictures in these men are severe, of long duration, and that treatment has been greatly neglected. It is inadvisable to attempt to open up the stricture with either sounds or metal catheters. There is great danger of producing false passages or of perforating the urethra.

Attempts to empty the bladder should be made with the smallest size (10F.) woven catheter with a coudé tip, or the smallest sizes (4-6F.) straight olive-tipped, woven catheters. Too much instrumentation with these catheters will do real damage, therefore one should not persist too long in attempting to pass them. It is better to insert threaded filiforms to which a woven Phillips urethral catheter, size 8-10F., is attached, after successfully passing one filiform through the strictured area.

#### *Hypertrophied Prostate*

The purpose of catheters in these cases is twofold:

1. To relieve acute retention.
2. To institute drainage preparatory to operation.

The first attempts to relieve acute retention in prostatics should be made with a small size (10 to 12F.) soft rubber catheter. If unsuccessful, either a woven coudé or bicoudé catheter should be tried. Metal catheters are contraindicated on these patients. When all other catheters have failed, a No. 6 olive-tipped ureteral catheter will often slip by the obstruction. A ureteral catheter is also very helpful in long-standing cases of obstruction where the bladder is greatly dilated, and sudden complete emptying may result in renal hemorrhage, shock, and even death. The small lumen of a ureteral catheter assures very slow emptying of the bladder, thereby preventing any of the complications just mentioned.

Preliminary drainage of the bladder with an indwelling catheter is an essential procedure in preparing patients for prostatectomy. Some urologists use a No. 18 or 20F. soft-rubber catheter tied in the urethra. In patients with a sensitive urethra this cannot be tolerated. There is also the possibility of epididymitis developing if the vasa are not first ligated. Therefore, many surgeons perform a two-stage prostatectomy, preferring to drain the bladder suprapubically with a Pezzar catheter.

If the bladder is greatly distended, one can pass a No. 20 Malecot catheter, stretched on a straight stylet, through a trocar which has been inserted into the bladder through the space of Retzius. A silkworm gut suture through the adjacent skin is tied about the catheter, thereby preventing its accidental removal. By this method there is no leakage of urine around the catheter, and the patient need not be hospitalized. This does away with a preliminary cystostomy, but should not be attempted where the bladder capacity is less than 500 cubic centimeters, as the trocar may perforate the bowel.

#### *Rupture of Posterior Urethra*

This condition usually results from an accident. Attempts should be made to pass a No. 22 to 24F. soft-rubber catheter. If the avulsion is not severe, the catheter will pass readily. If the catheter will not pass easily, stop all manipulations, as continued efforts will only increase the tear in the urethra.

It is better to open the bladder suprapubically and pass a catheter retrograde from the internal sphincter through the meatus. A soft-rubber catheter of the same size is tied to the tip of the one in the urethra. The catheters are then pulled out of the suprapubic wound until the openings of the second one are in the bladder. The two catheters are then cut apart and the bladder is closed around a Pezzar catheter. The urethral catheter is left *in situ* for two weeks or more, depending on the amount of urethra torn.

#### *Cord Injury*

Complete bladder retention resulting from injury to the cord is usually treated by intermittent catheterization. Sooner or later cystitis will develop, followed by pyelitis or pyelonephritis.

If the physician has the courage, he will refrain from any catheterization. For some time the bladder will be greatly distended with overflow incontinence. In time, however, automatic emptying of the bladder will result and urinary infection will not complicate the primary condition.

#### *General Consideration*

Physicians should at all times regard catheterization as an important surgical procedure. It should be performed only under proper aseptic conditions such as thorough cleansing of the meatus and the use of sterile towels, gloves, instruments, and lubricant.

In prostatitis and patients with urethral stricture, some urinary antiseptic should be given for several days beforehand.

Urethral chill is a frequent complication of catheterization. It can often be aborted by the oral administration of urinary antiseptics; by giving quinin every four hours for a short time before and after treatment, and by irrigating the urethra with an antiseptic solution before passing a catheter.

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### III. CATHETERIZATION OF THE FEMALE

ADOLPH A. KUTZMANN, M. D. (1930 Wilshire Boulevard, Los Angeles).—Catheterization of the female should be a simple procedure, but so complex has it been made with awkward and unnecessary preparations that it has become almost akin to a major operation in some institutions. This complex procedure is the result of two facts, the complicated standard technique as taught in training schools for nurses and the unnecessary preparation, almost bordering on fanaticism, demanded by many physicians to avoid supposed contamination, a presumed cause of cystitis.

Catheterization of the female is and should be kept a simple procedure. The extensive use of sterile towels covering the thighs, abdomen and bed, and excessive washing of the external genitalia pubes and vestibule are not necessary. The catheter, if it is of the proper type and skillfully handled, will never come in contact with these surfaces. The use of much cleansing fluid, such as green soap, 1-1000 mercury bichlorid solution, will leave the patient in a pool of contaminated

water, as well as a collection of unclean fluid in the posterior fourchette; exception to this may be in the case after vaginal surgery or during the puerperium. The use of the male soft-rubber catheter leads to awkward and painful catheterization. Consider the fact that the female urethra is about  $1\frac{1}{2}$  inches long, semi-crescent in shape. If the long catheter is used it must be gathered in a sterile gloved hand or permitted to drag along. It should be passed about  $1\frac{1}{2}$  to 2 inches, but it will not remain in place, slipping out because of the weight of the very long portion left outside. The natural reaction, therefore, is to keep pushing in such a catheter until about 4 to 6 inches are in the bladder. This will cause a loop to be formed against the bladder wall, resulting in pain. If an irrigation or instillation is to be given by the syringe method, such a kinked or looped catheter will tend to straighten out under the pressure, thereby enhancing the pain to the point of distress, and even trauma. Should the funnel gravity method be used, the fluid would probably not enter the bladder because of the kink in the catheter. To avoid this with the long, soft-rubber catheter, it must be constantly held in the proper place with one hand, thereby handicapping the skillful carrying out of the procedure when an instillation or an irrigation is to be given. The use of female catheters, 18 to 20 French in size, either glass, metal, or woven silk, with the proper shape and contour, will easily eliminate such troubles. The use of the short, stiff female catheter is always under complete control during the act of catheterization. The end of the catheter need never be touched by instrument nor hand, but directly passed into the bladder to the proper distance and without any difficulty. Because of their shape they will usually remain in the proper position of their own accord. The use of pyrex-glass catheters, and their careful examination prior to insertion, will avoid the chance of breaking. Should it be wished to eliminate this element of the danger of breaking, the metal or silk-woven catheter may be used. I believe that the danger of glass catheters breaking has been exaggerated. But one such case has been observed by the writer, and this was due to the permitting of an inexperienced student nurse to catheterize a pregnant woman, an obvious mistake.

The simple catheterization of a female may be carried out as follows: The patient is placed flat on her back, in the lithotomy position, either on a table or the bed. If the latter, the legs are pulled up and bent outward, thereby obtaining a position similar to the lithotomy. The attendant's hands should be thoroughly washed. If right-handed, stand to the right of the patient, if in bed. With the fingers of the left hand, the labia are spread apart so as to obtain a good view of the external urinary meatus. A good light should always be available. With the right hand, and using a good soft piece of cotton, dipped in a mild mercurial solution (1-1000 solution mercuric cyanid, merthiolate, oxycyanid of mercury or any other good mercurial solution), the vestibule is cleansed, washing from above downward, each time dis-

carding the used cotton. If it is necessary to let the labia fall back in place, a piece of cotton dipped in the cleansing solution is first placed in the vestibule. Then using a stiff female catheter (glass, metal, or woven silk), the cotton is removed and, again holding the labia apart, the catheter is inserted about two inches, utilizing gentle pressure and carefully following the urethral curve. Since the female catheters are shaped, they will usually remain in place without holding, permitting the use of both hands to carry out an irrigation or instillation. Keeping the procedure of catheterizing the female simple will, therefore, be less likely to result in a bladder infection. It is the traumatizing of the urethra and bladder, with the permitting of prolonged bladder distention or the overlooking of a urinary residual that really result in cystitis. Too often the nurse or house physician is unnecessarily blamed by the attending physician because of the lack of understanding this simple procedure of catheterization. Nothing predisposes to bladder infection as much as trauma, obstruction, residual, and distention. It is well-nigh impossible to infect a normal bladder, except possibly with the gonococcus.

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*Shortage of Radium.*—The National Radium Trust was established in 1929 with a capital of \$1,250,000, contributed by the public to provide radium for the treatment of disease. The trust appointed a National Radium Commission to distribute the radium to hospitals and clinics. In the report for the year ended July 1936, just published, the Commission states that, in order to secure efficient radium service for the country it will be necessary for the present radium centers to extend their work, new centers will have to be formed, and further supplies of radium are required. At most of the centers there has been a tendency to replace the interstitial and intracavitary use of small quantities of radium by the application at a distance of large quantities of radium. This method has led to many of the centers pressing the Commission for more radium. The report records much progress at almost all the centers and high level of initiative and zeal, which will go far toward solving the grave problem of the Commission. The trend of present-day experience indicates the advantages in certain cases of cancer of combining radium and x-ray treatment. It is calculated that in this country about forty thousand persons are suffering from cancer in those accessible organs in which radium may be of value, but that only eight thousand obtain the treatment.—*A. M. A. London Correspondent.*

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*Elaborate Preparations Against Attacks with Poison Gas.*—Britain will soon be the first country in the world to have gas masks available for the whole of the civil population of the capital. Scientific and technical experts have worked out a difficult and new problem: how to produce a simplified and improved gas mask, which can be made by the million by mass production methods. At a factory established by the government, the output will soon be half a million masks a week, and it is proposed to make thirty million, sufficient for the whole civilian population. The components of a gas mask are a light metal container filled with activated charcoal, several pieces of wire gauze, a thick wad of absorbent cotton, some layers of muslin fabric, metal springs, and a rubber mask or face piece into which the container is fixed. The mask fits securely under the chin, over the mouth, cheeks, and eyes. A cellulose acetate window permits vision. The mask is fixed to the head by easily fitting elastic straps.—*A. M. A. London Correspondent.*

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Yet all experience is an arch where through  
Gleams that untraveled world whose margin fades  
Forever and forever when I move.

—Alfred Tennyson